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(54) Abstract Title
Installing software in a palm-type device having a PROM and a RAM wherein the available space in the RAM is insufficient for a downloaded distribution package

(57) The invention relates to installing software on a computing device 41 having a RAM 40 containing the device operating system 45 and application programs 47-49 and a programmable ROM 43 also containing the application programs. The software is contained in a software distribution package requiring RAM capacity in excess of the available RAM in said device. First all application programs other than those required to support the device operating system in receiving said software distribution package are deleted from RAM 40. The software distribution package is then loaded into the same RAM 40 and the software from the software distribution package is loaded into the programmable ROM 43. Next the software distribution package is deleted from the RAM 40 and all deleted applications are downloaded from the programmable ROM 43 into the device RAM 40.

The invention is stated to find particular application to palm-type devices (e.g. mobile phones, PDA's, video set-top boxes). The software distribution package is preferably downloaded from the internet by installation of a Mini-update application 44 into the available (i.e. empty) RAM which enables the rest of the method of the invention to be carried out.

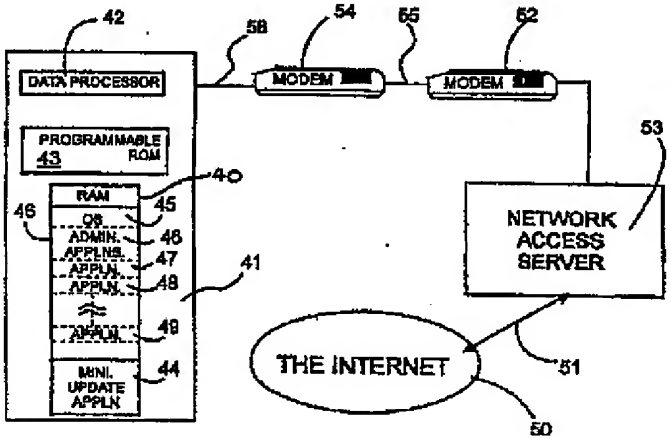

FIG. 1

GB 2 365 168 A

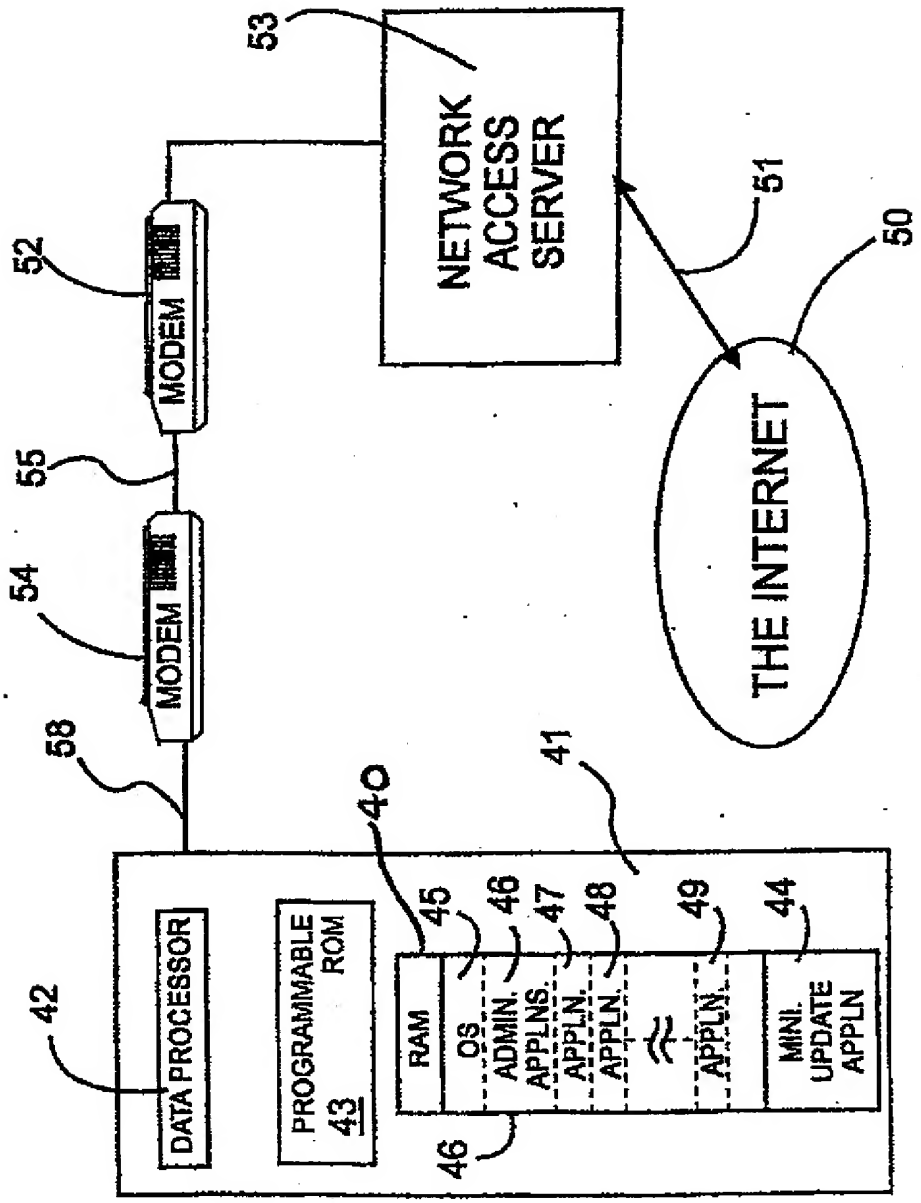
NETWORK ACCESS SERVER
THE INTERNET
MODEM
MODEM
DATA PROCESSOR
PROGRAMMABLE ROM 43
RAM
OS
ADMIN. APPLNS.
APPLN.
APPLN.
APPLN.
MNL. UPDATE APPLN
40
41
42
44
45
46
46
47
48
49
50
51
52
53
54
55
58

FIG. 1

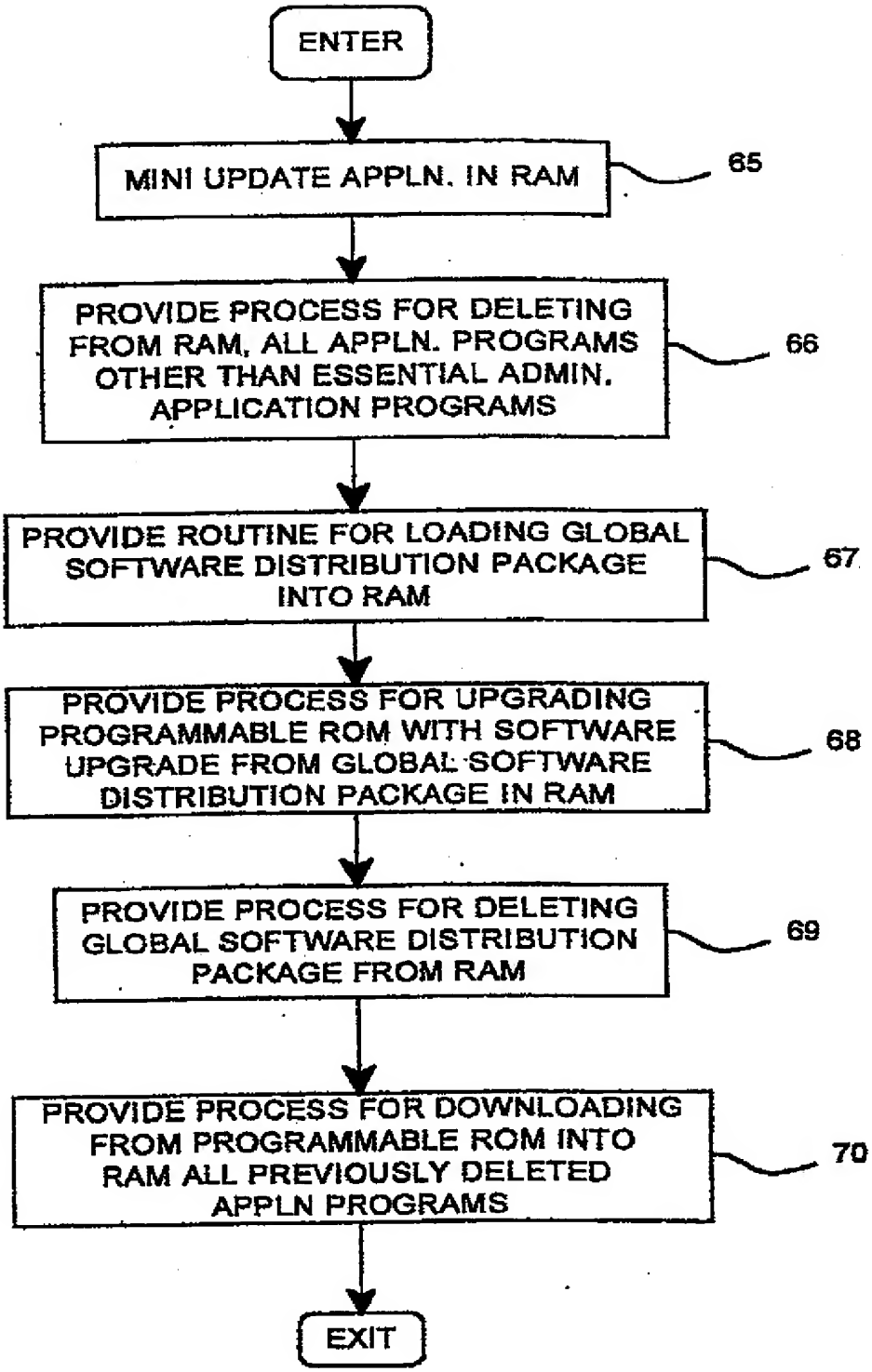
ENTER
MINI UPDATE APPLN. IN RAM
65
PROVIDE PROCESS FOR DELETING FROM RAM, ALL APPLN. PROGRAMS OTHER THAN ESSENTIAL ADMIN. APPLICATION PROGRAMS
66
PROVIDE ROUTINE FOR LOADING GLOBAL SOFTWARE DISTRIBUTION PACKAGE INTO RAM
67
PROVIDE PROCESS FOR UPGRADING PROGRAMMABLE ROM WITH SOFTWARE UPGRADE FROM GLOBAL SOFTWARE DISTRIBUTION PACKAGE IN RAM
68
PROVIDE PROCESS FOR DELETING GLOBAL SOFTWARE DISTRIBUTION PACKAGE FROM RAM
69
PROVIDE PROCESS FOR DOWNLOADING FROM PROGRAMMABLE ROM INTO RAM ALL PREVIOUSLY DELETED APPLN PROGRAMS
70
EXIT

FIG. 2

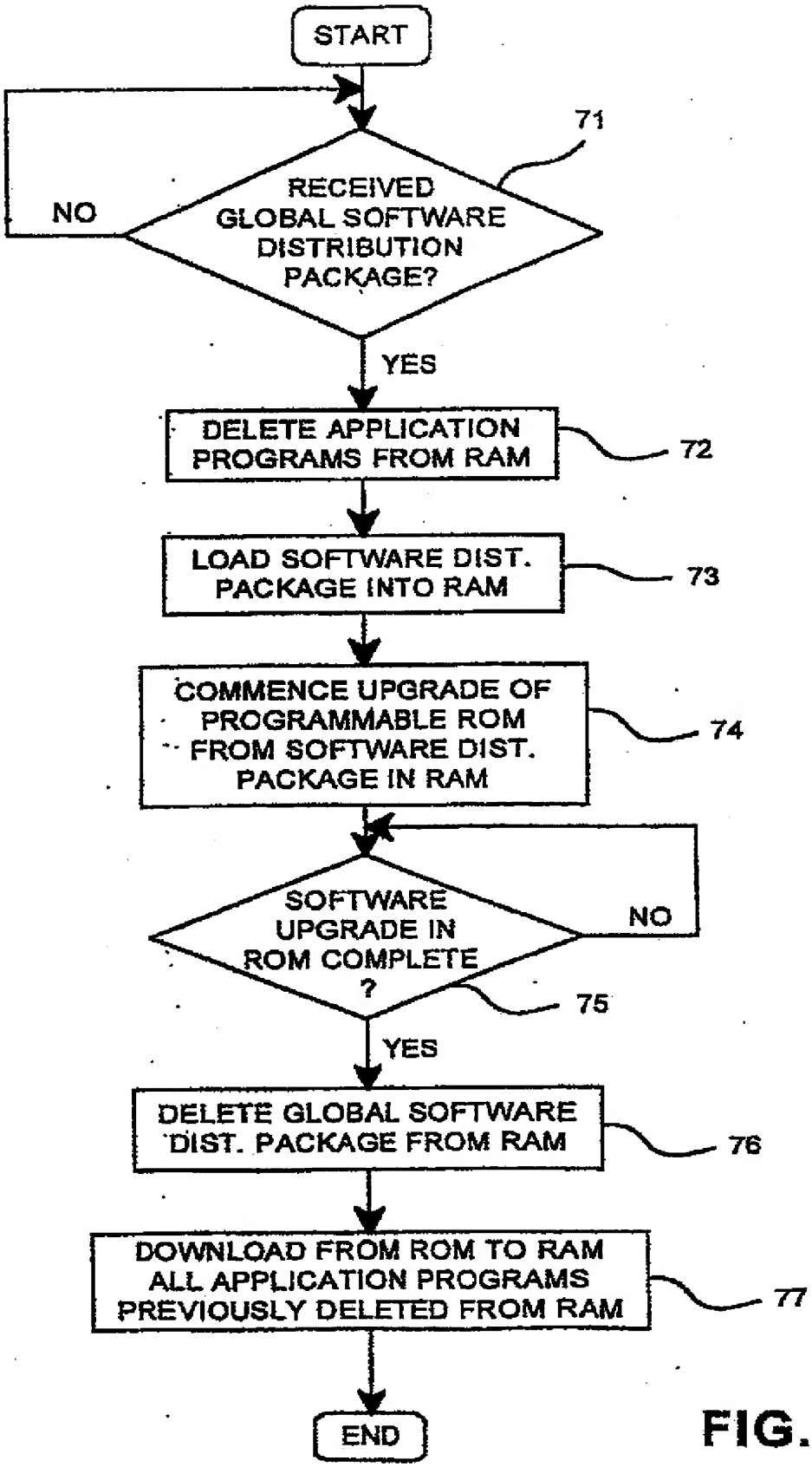
START
71
RECEIVED GLOBAL SOFTWARE DISTRIBUTION PACKAGE?
NO
YES
DELETE APPLICATION PROGRAMS FROM RAM
72
LOAD SOFTWARE DIST. PACKAGE INTO RAM
73
COMMENCE UPGRADE OF PROGRAMMABLE ROM FROM SOFTWARE DIST. PACKAGE IN RAM
74
SOFTWARE UPGRADE IN ROM COMPLETE ?
NO
75
YES
DELETE GLOBAL SOFTWARE DIST. PACKAGE FROM RAM
76
DOWNLOAD FROM ROM TO RAM ALL APPLICATION PROGRAMS PREVIOUSLY DELETED FROM RAM
77
END

FIG. 3

A METHOD AND COMPUTER PROGRAM FOR INSTALLING SOFTWARE ON A COMPUTING DEVICE

The present invention relates to a method and computer program for installing software on a computing device.

Personal Digital Assistant (PDA) display terminals (palm-type devices), such as the 3Com PalmPilot(™) and the International Business Machines Corporation (IBM) WorkPad(™) have been building a user base over the past few years. Current estimates are that there are a few million of these devices in present usage. While these personal devices have found limited selective markets among users with specific needs and habits, they have not, as yet, found the widespread appeal which was expected when they first began to appear almost a decade ago. Consequently, the technology is seeking applications of greater mass appeal. One area of great potential is in the area communication through the World Wide Web (Web) or Internet (used synonymously). In this connection, uses involving communication within the Web still require a fair degree of computer sophistication on the part of the user in receiving software via the Web, and in installing the software for basic program loading or in loading program upgrades. The user has to try to manipulate the very limited memory or storage resources available on the personal palm-type device in the installation of software and software upgrades.

With the globalization of computer system platforms involved in and linked through the Web, it has become increasingly common to distribute software and software upgrades which affect a wide variety of different Web computer system platforms through global software distribution packages such as Tivoli Corporation's software distribution package, the Tivoli Management Agent, which will install and/or upgrade software across a wide variety of computer system platforms from the PC to enterprise system levels. Because such global software distribution packages must function to distribute software upgrades including enterprise level, the distribution package is relatively large and requires a considerable amount of Random Access Memory (RAM) capacity in each device which it services. This does not present any problems to most of the computers which are being upgraded by the package; even PCs can provide sufficient RAM capacity. However, personal digital assistants, i.e. personal palm-type devices have very limited RAM, and thus lack the capacity to load such global software distribution packages. On the other hand, the global distribution packages are not dividable. Even though a great amount of the data in the package

is intended for higher order systems and not required to upgrade the personal palm-type devices, the global software distribution package is not dividable into just the components needed to handle the distribution to just the personal device. Each computer or system being distributed to or upgraded must store the entire global software distribution package in its RAM.

Accordingly, the invention provides a method for installing software on a computing device having a RAM containing the device operating system and application programs and a programmable ROM also containing the application programs, the software being contained in a software distribution package requiring RAM capacity in excess of the available RAM in said device, comprising the steps of: deleting from RAM all application programs other than those required to support the device operating system in receiving said software distribution package; loading said software distribution package into said RAM; loading software from said software distribution package into the programmable ROM; deleting said software distribution package from said RAM; and downloading from said programmable ROM into said device RAM, all deleted application programs.

According to another aspect, the invention provides a computer program having code recorded on a computer readable medium and operable to perform the method steps above on a computing device having a RAM containing the device operating system and application programs and a programmable ROM also containing the application programs.

The present invention therefore provides a solution to the problem of how a personal digital assistant or personal palm-type device can provide sufficient RAM capacity to store a complete global software distribution package so that the appropriate software or software upgrade may be installed into the device.

A preferred embodiment of the present invention will now be described, by way of example only, and with reference to the following drawings:

Fig. 1 is a generalized diagrammatic view showing the elements of a personal palm-type device attached to the Web;

Fig. 2 is an illustrative flowchart describing the setting up of the method of a preferred embodiment of the present invention for the handling

of the global software distribution package at a receiving personal palm-type device; and

Fig. 3 is a flowchart of the operation of program 44 of figure 1.

Referring to Fig. 1, there is shown a very generalized diagram of a personal palm-type device 41 connected into the Internet (Web) 50 for the purposes of this embodiment. However, before proceeding further with this description, it is considered helpful to provide some background with respect to PDAs or personal palm-type devices. Personal palm-type devices include Microsoft's WinCE line; the PalmPilot line produced by 3Com Corp.; and IBM's WorkPad. These devices are comprehensively described in the text, Palm III & PalmPilot, Jeff Carlson, Peachpit Press, 1998. They typically contain data processors, operating systems, about 2 to 4 MB of RAM and a permanent programmable memory, a programmable ROM which may be an EPROM or flash ROM which are described in the text at page 38. These flash ROMs can now provide 4 MB of capacity, thus all of the application programs conventionally stored on the personal palm device's RAM may now also be stored in this ROM, in addition to the device operating system and built-in applications which are, conventionally, also stored in the ROM. Flash ROMs may be written into by a technique known as flashing so that future updates can be distributed as software and flashed into the ROM hardware.

Personal palm devices also have a networking protocol: TCP/IP, which permits connection to the Web through PDA modems, which are described in greater detail at pp. 148-149 of the above-described text.

As set forth hereinabove, it has now become conventional to simultaneously distribute or deploy software applications with interdependent components as a single unit, i.e. a global software distribution package, to networks of a wide variety of servers and clients on an enterprise level scale. For example, the global Tivoli Software Distribution package developed by Tivoli Corporation and described on the Web at: http://www.tivoli.com/prod...ocuments/datasheets/software_dist.html will distribute software components across a network, the Web or portions of the Web.

A generalized diagram, in accordance with a preferred embodiment of the present invention, of a portion of the Web to which a personal palm-type device 41 is connected is shown in Fig. 1 to illustrate the global software distribution package transmission over the Web. The figure

is further to show how the appropriate portions of the distribution package are installed in the personal palm-type device 41 in accordance with the preferred embodiment. The personal palm-type device 41 includes a data processor 42, a programmable ROM 43, which is preferably the previously described Flash ROM, a RAM 40, which is shown in an operational state, loaded with the device's operating system 45, its administrative applications 46 including necessary utility applications, application programs 47 through 49, and the program of the preferred embodiment referred to as the Miniupdate Application 44. The device 41 is preferably connected into the Web 50 through standard Web wired modem connections. Reference may be made to the text, Mastering the Internet, G. H. Cady et al., published by Sybex Inc., Alameda, CA, 1996, particularly pp. 136-147, for typical connections between local display stations to the Web via access servers. The embodiment of Fig. 1 has a host-dial connection. Such host-dial connections have been in use for over 30 years through network access servers 53 which are linked 51 to the Web 50. The servers 53 may be maintained by a service provider to the personal palm-type device 41. The host's server 53 is accessed by the client device 41 through a normal dial-up telephone linkage 58 via modem 54, telephone line 55 and modem 52. The connection to access server 53 may also be made through wireless modems, described, for example, at pages 148 and 149 of the above-mentioned Palm III & Palm Pilot text. The global software distribution package is provided from a source, e.g. a Tivoli Software Distribution Package from a software distribution server, running on Unix™ OS, IBM OS/390™ or Microsoft WindowsNT™ using IP or IPX protocols. The package is distributed via Web access server 53 onto the Web 50 from which the package is accessed by personal palm device 41 through linkage 51 and Web access server 53.

Before proceeding with the description of the method and program of the preferred embodiment, conventional operation of the illustrative personal palm-type device should be considered. Herein the term personal palm-type device generally covers all varieties of palm-type devices, which have, at times, been referred to as palm top devices. These include cellular phones and related wireless devices, smartphones, Internet screen phones, as well as video set top boxes. While all of these do not necessarily fit the criterion of being held in the operator's palm during use, they share the following characteristics. In addition to some sort of rudimentary display, the devices 41 are characterized by having a RAM 40 of limited storage capacity which in the device operational state already includes the device operating system (OS)45, the device basic administrative and utility application programs 46 and substantially all of

the device application programs 47 through 49, which are all already launched in RAM in the normal device operational state. All of the OS and application programs are also permanently flashed into and stored in the device flash ROM 43.

Now with reference to the programming set up shown in Fig. 2, the program of the preferred embodiment of the present invention is set up, step 65, to reside in RAM, Miniupdate 44, Fig. 1. When the global software distribution package is received at the personal palm device from the Web, a process must be set up, step 66, for deleting from RAM all application programs 47 through 49 (Fig. 1), other than the administrative application programs 46 which are required to support the device operating system in receiving the software distribution package.

A routine is then provided for then loading the global software distribution package in RAM, step 67, by using the additional RAM capacity made available through the deletion of applications 47 through 49. At step 68, the process for the software upgrade or distribution through the received global package is provided. This upgrade or distribution is done by writing into the appropriate system and programs stored in ROM 43 through flashing the ROM. Upon the completion of step 68, a process is set up for completely deleting the global software distribution package from RAM. Then, step 70, the process is set up to download back into RAM, all of the application programs previously deleted from RAM to make capacity available for the global software distribution package. These are downloaded from their permanent storage in ROM, and the device RAM is restored to its previous but upgraded state.

Now, with reference to the flowchart of Fig. 3 the operation of program 44 of figure 1 will be described in accordance with a preferred embodiment of the present invention. Initially, a determination is made as to whether the global software distribution package has been received, step 71. If No, then the process is returned to step 71 and the package is awaited. When the package is received and the determination from step 71 is Yes, then, step 72, the unnecessary application programs are deleted from RAM, and the global software distribution package is loaded into RAM, step 73. At this stage, step 74, the software distributed upgrade is commenced by writing into flash ROM from the software distribution package in RAM. This is conducted under the control of a distribution management agent within the software distribution package. In the case of the Tivoli Software Distribution Package, this is known as the Tivoli Management

Agent. Next, decision step 75, a determination is made as to whether the upgrade is complete. If No, the process branches back to step 75 where the completion of step 74 is awaited. When completed and the decision from step 75 is Yes, then step 76, the global software distribution package is deleted from RAM, step 76, and the previously deleted application programs are downloaded from ROM to RAM, step 77. The process is then exited leaving the personal palm-type device in its original but upgraded state.

CLAIMS

1. A method for installing software on a computing device having a RAM containing the device operating system and application programs and a programmable ROM also containing the application programs, the software being contained in a software distribution package requiring RAM capacity in excess of the available RAM in said device, comprising the steps of:

deleting from RAM all application programs other than those required to support the device operating system in receiving said software distribution package;

loading said software distribution package into said RAM;

loading software from said software distribution package into the programmable ROM;

deleting said software distribution package from said RAM; and

downloading from said programmable ROM into said device RAM, all deleted application programs.

2. The method of claim 1 wherein the software distribution package is transmitted to said computer device over a communication network.

3. The method of claim 2 wherein the software distribution package is transmitted to said computer device over the World Wide Web.

4. The method of any one of claims 1 to 3 wherein said computing device is synchronized with a computer controlled receiving station on said World Wide Web, and the software distribution package is received by said computing device through said receiving station.

5. A computer program having code recorded on a computer readable medium and operable to perform the steps of claim 1 on a computing device having a RAM containing the device operating system and application programs and a programmable ROM also containing the application programs.

Application No: GB 0030126.7
Claims searched: 1-5

Examiner: Paul Jefferies
Date of search: 22 November 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): G4A (AFGDC, AFGDX, AFL)

Int Cl (Ed.7): G06F 9/445, 12/06, 13/38, 13/42

Other: ONLINE: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2324893 A	(SAMSUNG) See paragraph at page 2, line 32 and page 5.	1-5

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.